

## ***Interactive comment on “Geophysical validation of MIPAS-ENVISAT operational ozone data” by U. Cortesi et al.***

**U. Cortesi et al.**

Received and published: 18 August 2007

### **General comments**

*Ozone profiles measured with MIPAS-E were comprehensively validated by a lot of co-located data. The authors concluded that the operational ozone data are ready for use in quantitative analysis in the stratosphere. Since the policy of this journal does not have paper length restrictions, I do not suggest to shorten the length of this paper. Rather, I suggest to include some additional results. The authors made one by one sensor comparisons, but do not made multiple sensor comparisons in a coincident airmass. The authors speculated that some discrepancies between MIPAS and others found in the lower to lowermost stratosphere are due to inhomogeneities in horizontal distribution of ozone. If so, the ozone variation can be expected from a result of comparison among MIPAS-E and several sensors in a coincident airmass in*

*such an altitude range.*

**ANSWER:** The use of ozone measurements by several sensors exploring the same air masses can be a valuable tool to investigate the proposed explanation of the discrepancies observed at lower altitudes. We made a first attempt in this direction, by comparing MIPAS measurements with remote-sensing and in situ data acquired by the M-55 Geophysica payload at mid-latitude and in the Arctic region (see section 5.4). We agree with the comment by referee #1 that further investigations of this issue are required, but we have chosen not to include them in our work, in order to limit the overall length of the paper and to not delay its publication. This issue is strictly related to further studies currently in progress that we mention in sub-section 5.4.3 and that will be considered as part of a separate dedicated paper.

*Further, is there any correlation between retrieved profiles and a priori profiles for MIPAS-E in the lower to lowermost stratosphere? Are the discrepancies found in those altitude regions related to constraints of a priori profiles?*

**ANSWER:** MIPAS level-2 operational processor relies on a retrieval algorithm based on a unconstrained non-linear least-square fitting method (it does not use Optimal Estimation). A priori profiles are simply used as initial guess in the first step of the iterative process and do not provide any contribution to the information content of the retrieved profile when convergence is reached. As a consequence, there is no reason to expect any correlation between the results of the retrieval and the a priori profiles adopted for the initial guess at any altitude.

To help reader understanding, we added an explicit reference to the algorithm used for MIPAS operational processing at P. 5813, L. 14:

"The data obtained during the instrument full spectral resolution mission, from 6 July 2002 to 26 March 2004, have been processed by using v4.61 and v4.62 of ESA level-1b and level-2 (based on an unconstrained non linear-least-square fit procedure) operational algorithms, as described in details in Kleinert et al. (2007) and in Raspollini et al. (2006) respectively, ...".

## Specific comments

*p.5821 L15-16: LS and HS are abbreviated, but inefficiently utilized hereafter.* **ANSWER:** abbreviations removed

*p.5823 L1: A corresponding figure (comp. w/ Hawaii sondes) is missing.*

**ANSWER:** in order to keep the figures limited to a reasonable number, we have chosen to show only the plot of the mid-latitude results, as an example. Results for Hawaii (as well as for other stations mentioned in the text) are not shown.

*p.5840 L16: Make Potential Temperature (PT). Then it will be efficiently utilized hereafter.*

**ANSWER:** we have not used PT as an abbreviation for Potential Temperature to avoid possible confusion with pressure and temperature (abbreviated in the paper as pT).

*p.5849 L22: Define pvu.*

**ANSWER:** definition added - "... pvu (1 pvu =  $10^{-6}$  K  $m^2$   $kg^{-1}$   $s^{-1}$ ), ...".

*p.5859 L1: Define a measurement response.*

**ANSWER:** definition of measurement response added: "... and a measurement response (defined by Urban et al. (2005) as the sum of the averaging kernel functions at a given altitude and providing an estimate of the relative contribution to the information coming from the measurements and from the a priori) larger than 0.75 ...".

## Technical corrections

*p.5810 L13: Von del Gathen ! von der Gathen*  
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**ANSWER:** corrected

*p.5815 L6: Von ! von? It appears several places hereafter.*

**ANSWER:** corrected

*p.5816 L7: Electrochemical cell ! Electrochemical concentration cell*

**ANSWER:** corrected

*p.5816 L8: board of small ! board small*

**ANSWER:** corrected

*p.5827 L18: Delete ")” after 1995.*

**ANSWER:** ")” deleted

*p.5835 L4: A period is missing after bin.*

**ANSWER:** period added

*p.5860 L9: mm !  $\mu$ m*

**ANSWER:** corrected

*p.5862 L13: 30 deg. SN ! 30 deg. N*

**ANSWER:** corrected

*p.5870 L20: 100 does not equal to  $10^{-10}$ .*

**ANSWER:** "VMR values greater than 100 ppmv, equal to  $10^{-10}$  ppmv, or ..." corrected to "VMR values greater than 100 ppmv, or equal to  $10^{-10}$  ppmv, or ...".

*p.5878 L6: Delete ")” after hPa.*

**ANSWER:** ")” deleted

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 5805, 2007.

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